Moving dialysis treatment into peoples' homes

Sally J Wellard

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Abstract

Home based dialysis treatments were among the earliest high technology treatments widely adopted in Australia for home use. Advances in membrane technology together with the development of access devices and delivery systems provided the opportunity of extending dialysis as a treatment to a wider group of patients. The evolution of home dialysis was influenced by serendipity. The right people and technology came together at the same time. Dr John Dawborn, supported by Sue Evans, trained with the first home haemodialysis patient Peter Morris in Melbourne, who subsequently transferred to Sydney.

Key words:
History, Australia, home dialysis

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Home based dialysis treatments were among the earliest high technology treatments widely adopted in Australia for home use. Advances in membrane technology together with the development of access devices and delivery systems provided the opportunity of extending dialysis as a treatment to a wider group of patients. This article describes the circumstances that supported home haemodialysis becoming a viable treatment option in Australia and is an edited excerpt from my doctoral thesis which examined nurses' roles with families of people dialysing at home (Wellard 1996).

Advances in technique

Prior to Scribner and colleagues developing the Quinton-Scribner arterio-venous shunt as an effective method for ready access to the circulation (Scribner 1990) treatment was limited to people with acute renal failure because access to patients' circulation was rapidly exhausted by scar tissue and clot formation (Albers 1989). The shunt provided a more permanent access to the circulation, but also presented significant risks of haemorrhage and infection. It was Brescia and Cimino's development of the A-V fistula in 1966 that created a safer, and consequently, more widely used method for access to the circulation (Feldman, Korbin & Wasserstein 1996).

Similarly, dialysate delivery systems and membranes used in the 1950s and early 1960s for haemodialysis were cumbersome and expensive. They were difficult to use and presented high risks of clotting, infection and blood loss (McBride 1989). It was clear that there was a need for equipment to be compact and reduce the risks to patients if dialysis was going to become a viable treatment for a larger number of patients. The development of proportioning systems for continually mixing water with dialysate removed the need for large tanks (600 gallons) (Drukker 1989) and improved the efficiency of solute exchange. At the same time, advances in membrane technology saw the first commercial availability of disposable, compact, sterile dialysers produced by Travenol Laboratories in the USA and Gambro Pty Ltd in Sweden.

Economic and policy context

These advances contributed to expansion of dialysis programs to larger numbers of people and the development of home dialysis. This move can be seen as both an economic and political response to the increasing costs of treating an increasing number of highly dependent patients and as an expansion of the domain of the fledgling medical speciality of nephrology.

Although dialysis treatments were accepted in medical practice, they were expensive and predominantly unfunded by insurance companies or governments (Drukker 1989, Halper 1989). The increased demand for treatment coupled with problems of financing and training medical and nursing personnel saw the introduction of the concept of 'self-dialysis' (Drukker 1989). Self-dialysis was initially introduced in 1963 as part of in-hospital treatment by Shaldon (1968) in London (UK). Home dialysis was a natural extension of self-dialysis and in 1964 began in Boston. The following year it was commenced in both London (UK) and Seattle (USA). The arguments offered to support the introduction of home based dialysis were that it fostered the well being of patients, increased the survival of dialysis patients, promoted independence and reduced the need for rehabilitation and associated costs (D'Amico & Bazzi 1989).

The growth of dialysis as a long term treatment concentrated on the 'saving of

Author Details:
Professor Sally J Wellard is Professor of Nursing, School of Nursing, University of Ballarat

Correspondence to:
Professor Sally Wellard at s.wellard@ballarat.edu.au

lives', technology and its management (Goodspeed & Sylvester 1985). The desire to provide a treatment while waiting for transplant was strongly grounded in the medical desire to find a cure. The work of developing dialysis was constantly challenging, yet it was highly motivating and the pioneering teams were close knit, working with a sense of oneness (Fox 1975). Evans recalled the focus of energies of workers involved in the development of dialysis as:

> we all became consumed with developing the equipment to match the need; it wasn't that the patient was secondary, it is just that it took all our energies and time to get the machines ready, the dialysers ready, rinsing, washing, sterilising and fixing and all this time the patient was suffering from future shock. (1980, p.12)
>
> Due to the demand for treatment exceeding availability, selection criteria needed to be applied.
>
> Different centres apply different selection criteria, indicating that suitability is a relative term; nevertheless, there is some general agreement about age, disease state, intelligence, emotional maturity, and reablement prospects (Shaldon, 1968 p.522.)

Whilst Shaldon enumerated these criteria, how they were assessed and applied in individual cases is not clear. The cut off age for treatment in the early 1970s was between 45-55 years. The presence of other significant illness (both physical and emotional) or poor compliance to medical treatments were seen as exclusion criteria. Physicians indicated the use of sound medical judgement, yet the social and psychological criteria (for example, emotional maturity and intelligence) seemed outside the accepted clinical skills of medicine (Halper 1989).

Nurses had minimal involvement in the care of individuals receiving dialysis treatment when the treatment was first offered in Australia. As the treatment became more widely accepted and consequently offered to a wider number of 'less healthy' people, nursing involvement grew. Patients accepted in the program were significantly sicker with more complications, 'you just had to have people with nursing skills' (S.M.Evans, personal communication 9/7/92).

Home dialysis in Australia

Australia followed a similar course to Europe and USA in treating ESKD, but lagged behind, due to the relatively small number of patients and limited number of physicians working in the new specialty of nephrology. Treatment for renal failure was centred at the major teaching hospitals in the capital cities of Sydney, Melbourne and Adelaide. Whilst dialysis was used to treat acute renal failure, renal units in the 1960s were committed to transplantation as a long term treatment for ESKD (Tiller et al. 1969). Consequently there was less interest in refining the technique of dialysis.

The evolution of home dialysis in Australia was described by one of the first dialysis workers as largely influenced by serendipity (Evans, personal correspondence 1992). It was a case of the people, the technology and the politics being congruent at the same time. These circumstances have been described by others as influential in the development of home based care involving technology (Handy 1989).

The key person in the development of Australian home dialysis was Dr John Dawborn. He has been described as a campaigner for home dialysis, whose commitment to this task was an essential element in its' successful introduction.

In the 1960s Dawborn completed his physician training in Seattle, the 'Mecca' for haemodialysis (Fox 1975), under Scribner who was an international leader in dialysis development. Whilst in Seattle, he participated in the training of the first patients for home dialysis. When he returned to Australia to work at the Royal Melbourne Hospital (RMH), he was committed to home dialysis as the only viable means of providing ongoing treatment to the many people with chronic renal failure awaiting renal transplantation (Evans personal communication 1992).

Another key person was the first person to dialyse at home in Australia. In 1967 an Australian businessman, Peter Morris, developed ESRD while visiting the USA. He was treated in Seattle by the Scribner group. As Morris wanted to return to Australia, this was seen by Dawborn and Scribner as an opportunity to start home dialysis in Australia (Evans 1992). Morris was sponsored by his then employer for the cost of the equipment and began training at the RMH in October 1967.

The machine, a Drake Willock, had not been used in Australia before, and was sent with the semi permeable membranes and spare parts before Morris's arrival. Dawborn asked one of the technicians involved in dialysis at RMH to assist in training Morris for home dialysis. Sue Evans taught Morris in a somewhat covert manner, his training was concealed to minimise interference with the other work of the unit. They did not disclose to the renal unit that they were training someone to dialyse at home. After six weeks Morris and his wife returned to their home in Sydney to dialyse, initially with support from Dawborn and Evans. Morris's medical care was transferred to Sydney physician Dr Stewart (Dawborn & Marshall 1968, Evans 1980).

The training of Morris saw the beginning of home dialysis training centres in both Sydney and Melbourne (Dawborn et al. 1971, Stewart, Neilsford-Jones et al. 1970). Establishing these units required innovation in adapting the available equipment. The parent hospitals were prepared to carry the cost of establishing dialysis treatment, but funds were limited (Tiller et al. 1969). There was no Commonwealth funding at this stage for machinery and costly pharmaceutical supplies required for treatment (Evans 1980). Most machines used in home environments were purchased by patients. Morris was successful in getting the Lion's Club of Australia to purchase machine for home use in the early 1970s (Morris 1984). Many local service clubs and community organisations raised money to help support patients from their area to dialyse at home (Stewart, Gallery et al. 1973).

Conclusion

Advances in technological innovations related to dialysis created an opportunity to extend and refine treatment for people with ESRD. The extra ordinary efforts of people like Dawborn and Morris provided models of possibility, and their work was reproduced across the country. As a consequence of extending complex treatments to home environments, there has been an increase in the number of people who have been able to receive treatment. In the 30th report of ANZDATA home is now the location of dialysis for 31% of total number of people receiving renal replacement therapies (McDonald, Chang & Excell, 2008).

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